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# THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

**Pioneer Hi-Bred International, Inc.**

Whereas, THERE HAS BEEN PRESENTED TO THE

**Secretary of Agriculture**

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED NOVEL VARIETY OF SEXUALLY REPRODUCED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF *eighteen* YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, IMPORTING IT, OR EXPORTING IT, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT (P.L. 85-625, 70 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

CORN

'PHK76'

In Testimony Whereof, I have hereunto set my hand and caused the seal of the Plant Variety Protection Office to be affixed at the City of Washington, D. C. this 29th day of July in the year of our Lord one thousand nine hundred and eighty-eight.

Attest:

*Kenneth Evans*  
Commissioner  
Plant Variety Protection Office  
Agricultural Marketing Service

*Todd Piper*  
Todd Piper  
9 App. No. 10/769,212

REF  
A10

U.S. DEPARTMENT OF AGRICULTURE AGRICULTURAL MARKETING SERVICE				APPROVAL EXPIRES 2-28-88 FORM APPROVED: OMB NO. 0581-0085	
<b>APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE</b> (Instructions on reverse)				Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).	
1. NAME OF APPLICANT(S) Pioneer Hi-Bred International, Inc.		2. TEMPORARY DESIGNATION		3. VARIETY NAME PHK76	
4. ADDRESS (Street and No. or R.F.D. No., City, State, and Zip Code) Plant Breeding Division Department of Corn Breeding PO Box 85, Johnston, IA 50131-0085		5. PHONE (Include area code) 515/270-3300		FOR OFFICIAL USE ONLY VPPO NUMBER 8800036	
6. GENUS AND SPECIES NAME Zea mays		7. FAMILY NAME (Botanical) Gramineae		FILING DATE December 15, 1987 TIME 1:30 <input type="checkbox"/> A.M. <input checked="" type="checkbox"/> P.M.	
8. KIND NAME Corn		9. DATE OF DETERMINATION 1983		AMOUNT FOR FILING \$ 1800.00 DATE December 18, 1987 AMOUNT FOR CERTIFICATE \$ 200.00 DATE May 19, 1988	
10. IF THE APPLICANT NAMED IS NOT A "PERSON," GIVE FORM OF ORGANIZATION (Corporation, partnership, association, etc.) Corporation				12. DATE OF INCORPORATION May 6, 1926	
11. IF INCORPORATED, GIVE STATE OF INCORPORATION Iowa					
13. NAME AND ADDRESS OF APPLICANT REPRESENTATIVE(S), IF ANY, TO SERVE IN THIS APPLICATION AND RECEIVE ALL PAPERS Dr. Richard L. McConnell Pioneer Hi-Bred International, Inc. Plant Breeding Division PO Box 85, Johnston, IA 50131-0085 PHONE (Include area code): 515/270-3363					
14. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED					
a. <input checked="" type="checkbox"/> Exhibit A, Origin and Breeding History of the Variety (See Section 52 of the Plant Variety Protection Act.) b. <input checked="" type="checkbox"/> Exhibit B, Novelty Statement. c. <input checked="" type="checkbox"/> Exhibit C, Objective Description of Variety (Request form from Plant Variety Protection Office.) d. <input checked="" type="checkbox"/> Exhibit D, Additional Description of Variety. e. <input checked="" type="checkbox"/> Exhibit E, Statement of the Basis of Applicant's Ownership.					
15. DOES THE APPLICANT(S) SPECIFY THAT SEED OF THIS VARIETY BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED? (See Section 83(u) of the Plant Variety Protection Act.) <input type="checkbox"/> Yes (If "Yes," answer items 16 and 17 below) <input checked="" type="checkbox"/> No					
16. DOES THE APPLICANT(S) SPECIFY THAT THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS? <input type="checkbox"/> Yes <input type="checkbox"/> No			17. IF "YES" TO ITEM 16, WHICH CLASSES OF PRODUCTION BEYOND BREEDER SEED? <input type="checkbox"/> Foundation <input type="checkbox"/> Registered <input type="checkbox"/> Certified		
18. DID THE APPLICANT(S) PREVIOUSLY FILE FOR PROTECTION OF THE VARIETY IN THE U.S.? <input type="checkbox"/> Yes (If "Yes," give date) <input checked="" type="checkbox"/> No					
19. HAS THE VARIETY BEEN RELEASED, OFFERED FOR SALE, OR MARKETED IN THE U.S. OR OTHER COUNTRIES? <input type="checkbox"/> Yes (If "Yes," give names of countries and dates) <input checked="" type="checkbox"/> No					
20. The applicant(s) declare(s) that a viable sample of basic seeds of this variety will be furnished with the application and will be replenished upon request in accordance with such regulations as may be applicable. The undersigned applicant(s) is (are) the owner(s) of this sexually reproduced novel plant variety, and believe(s) that the variety is distinct, uniform, and stable as required in Section 41, and is entitled to protection under the provisions of Section 42 of the Plant Variety Protection Act. Applicant(s) is (are) informed that false representation herein can jeopardize protection and result in penalties.					
SIGNATURE OF APPLICANT Pioneer Hi-Bred International, Inc. by: <u>Richard L. McConnell</u>				DATE 12-9-87	
SIGNATURE OF APPLICANT				DATE	

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C O R N

PHK76

14A. Exhibit A. Origin and Breeding History

Pedigree: AD18/B02)X4424XX

Pioneer line PHK76, Zea mays L., a yellow dent corn inbred, was developed by Pioneer Hi-Bred International, Inc. from the single cross AD18 x B02 using the pedigree method of breeding. The progenitors of PHK76 are proprietary inbred lines of Pioneer Hi-Bred International, Inc. Selfing and selection were practiced within the above F1 cross for seven generations in the development of PHK76 at Mankato, Minnesota. During line development, crosses were made to inbred testers for the purpose of estimating the line's combining ability. Yield trials were grown at Mankato, Minnesota and at other Pioneer research stations in the early-maturity areas of the U.S. Corn Belt. After initial testing, additional hybrid combinations have been evaluated and subsequent generations of the line have been grown and hand-pollinated with observations made for uniformity.

PHK76 has shown uniformity and stability for all traits as described in Exhibit C (form LPGS-470-28) - "Objective Description of Variety." It has been self-pollinated and ear-rowed a sufficient number of generations with careful attention paid to uniformity of plant type to assure genetic homozygosity and phenotypic stability. The line has been increased both by hand and in isolated fields with continued observations for uniformity.

No variant traits have been observed or are expected in PHK76.

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## 14B. Exhibit B. Novelty Statement

PHK76 is most similar to the Pioneer inbred line PHG47 (PVP Certificate #8600131). PHK76 is later in maturity compared to PHG47. PHK76 sheds pollen and silks approximately 15 (1 day) and 25 (1 day) growing degree units later than PHG47. PHK76 is taller and higher eared than PHG47.

	<u>GDU-Shed</u>	<u>GDU-Silk</u>	<u>Plant Height (in.)</u>	<u>Ear Height (in.)</u>
PHK76	1355	1377	80.1	29.7
PHG47	1339	1353	63.9	19.4
Reps	187	152	131	130
Diff.	16	24	16.2	10.3
Prob.	.000#	.000#	.000#	.000#

Data are from four years (1984-87) and 73 environments.

# = 1% significance, + = 5% significance, \* = 10% significance

U.S. DEPARTMENT OF AGRICULTURE  
AGRICULTURAL MARKETING SERVICE  
LIVESTOCK, POULTRY, GRAIN & SEED DIVISION  
BELTSVILLE, MARYLAND 20705

FORM APPROVED: OMB NO. 40-R3822

EXHIBIT C  
(Corn)

OBJECTIVE DESCRIPTION OF VARIETY  
CORN (ZEA MAYS)

NAME OF APPLICANT(S) Pioneer Hi-Bred International, Inc.	FOR OFFICIAL USE ONLY
ADDRESS (Street and No., or R.F.D. No., City, State, and ZIP Code) Plant Breeding Division Department of Corn Breeding PO Box 85 Johnston, IA 50131-0085	PVPO NUMBER 8800036
	VARIETY NAME OR TEMPORARY DESIGNATION PHK76

Place the appropriate number that describes the varietal character of this variety in the boxes below.  
Place a zero in first box (e.g., 089 or 09) when number is either 99 or less or 9 or less.

1. TYPE:

2 1 = SWEET 2 = DENT 3 = FLINT 4 = FLOUR 5 = POP 6 = ORNAMENTAL

2. REGION WHERE BEST ADAPTED IN THE U.S.A.:

2 1 = NORTHWEST 2 = NORTHCENTRAL 3 = NORTHEAST 4 = SOUTHEAST  
5 = SOUTHCENTRAL 6 = SOUTHWEST 7 = MOST REGIONS

3. MATURITY (In Region of Best Adaptability):

(Under "comments" (pg. 3) state how heat units were calculated)

6 3 DAYS FROM EMERGENCE TO 50% OF PLANTS IN SILK 1 4 0 0 HEAT UNITS  
- - DAYS FROM 50% SILK TO OPTIMUM EDIBLE QUALITY - - HEAT UNITS  
- - DAYS FROM 50% SILK TO HARVEST AT 25% KERNEL MOISTURE - - HEAT UNITS

4. PLANT:

2 2 4 CM. HEIGHT (To tassel tip) 8 4 CM. EAR HEIGHT (To base of top ear)  
0 6 CM. LENGTH OF TOP EAR INTERNODE

Number of Tillers:

Number of Ears Per Stalk:

1 1 = NONE 2 = 1-2 3 = 2-3 4 = > 3 1 1 = SINGLE 2 = SLIGHT TWO-EAR TENDENCY  
3 = STRONG TWO-EAR TENDENCY 4 = THREE-EAR TENDENCY

Cytoplasm Type:

1 1 = NORMAL 2 = "T" 3 = "S" 4 = "C" 5 = OTHER (Specify)

5. LEAF (Field Corn Inbred Examples Given):

Color:

2 1 = LIGHT GREEN (HY) 2 = MEDIUM GREEN (WF9) 3 = DARK GREEN (B14) 4 = VERY DARK GREEN (K165)

Angle from Stalk (Upper half):

Sheath Pubescence:

1 1 = < 30° 2 = 30-60° 3 = > 60° 1 1 = LIGHT (W22) 2 = MEDIUM (WF9)  
3 = HEAVY (OH26)

Marginal Waves:

Longitudinal Creases:

1 1 = NONE (HY) 2 = FEW (WF9) 3 = MANY (OH7L) 1 1 = ABSENT (OH51) 2 = FEW (OH56A)  
3 = MANY (PA11)

Width:

Length:

1 2 CM. WIDEST POINT OF EAR NODE LEAF 0 7 0 CM. EAR NODE LEAF  
1 8 NUMBER OF LEAVES PER MATURE PLANT

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## 6. TASSEL:

NUMBER OF LATERAL BRANCHES

Branch Angle from Central Spike:

1 = &lt; 30°

2 = 30-40°

3 = &gt; 45°

Penduncle Length:

CM. FROM TOP LEAF TO BASAL BRANCHES

Pollen Shed:

1 = LIGHT (WF9)

2 = MEDIUM

3 = HEAVY (KY21)

Anther Color:

1 = YELLOW

2 = PINK

3 = RED

4 = PURPLE

5 = GREEN

Glume Color:

6 = OTHER (Specify)

Pollen Restoration for Cytoplasm (0 = Not Tested, 1 = Partial, 2 = Good)

"T"

"S"

"C"

OTHER (Specify Cytoplasm and degrees of restoration)

## 7. EAR (Husked Ear Data Except When Stated Otherwise):

CM LENGTH

MM. MID-POINT  
DIAMETER

GM. WEIGHT

Kernel Rows:

1 = INDISTINCT

2 = DISTINCT

NUMBER

1 = STRAIGHT

2 = SLIGHTLY CURVED

3 = SPIRAL

Silk Color (Exposed at Silking Stage):

1 = GREEN

2 = PINK

3 = SALMON

4 = RED

Husk Color:

FRESH

1 = LIGHT GREEN

2 = DARK GREEN

3 = PINK

DRY

4 = RED

5 = PURPLE

6 = BUFF

Observed Pale Yellow

Husk Extension: (Harvest Stage)

1 = SHORT (Ears Exposed)

2 = MEDIUM (Barely Covering Ear)

3 = LONG (8-10CM Beyond Ear Tip)

4 = VERY LONG (&gt; 10 CM)

Husk Leaf:

1 = SHORT (&lt; 8 CM)

2 = MEDIUM (8-15 CM)

3 = LONG (&gt; 15 CM)

Shank:

CM LONG

NO. OF INTERNODES

Position at Dry Husk Stage:

1 = UPRIGHT

2 = HORIZONTAL

3 = PENDENT

Taper:

1 = SLIGHT

2 = AVERAGE

3 = EXTREME

Drying Time (Unhusked Ear):

1 = SLOW

2 = AVERAGE

3 = FAST

## 8. KERNEL (Dried):

Size (From Ear Mid-Point):

MM LONG

MM. WIDE

MM. THICK

Shape Grade (% Rounds)

1 = &lt; 20

2 = 20-40

3 = 40-60

4 = 60-80

5 = &gt; 80

## 8. KERNEL (Dried):

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1 Pericarp Color: 1 = COLORLESS 2 = RED-WHITE CROWN 3 = TAN 4 = BRONZE  
5 = BROWN 6 = LIGHT RED 7 = CHERRY RED  
8 = VARIEGATED (Describe) \_\_\_\_\_

1 Aleurone Color: 1 = HOMOZYGOUS 2 = SEGREGATING (Describe) \_\_\_\_\_

3 Observed strong orange-yellow  
1 = WHITE 2 = PINK 3 = TAN 4 = BROWN 5 = BRONZE 6 = RED  
7 = PURPLE 8 = PALE PURPLE 9 = VARIEGATED (Describe) \_\_\_\_\_

3 Observed strong orange-yellow

3 Endosperm Color: 1 = WHITE 2 = PALE YELLOW 3 = YELLOW 4 = PINK-ORANGE 5 = WHITE CAP.

Endosperm Type:

3 1 = SWEET (su1) 2 = EXTRA SWEET (sh2) 3 = NORMAL STARCH 4 = HIGH AMYLOSE STARCH  
5 = WAXY STARCH 6 = HIGH PROTEIN 7 = HIGH LYSINE 8 = OTHER (Specify) \_\_\_\_\_

2 7 GM. WEIGHT /100 SEEDS (Unsize Sample)

## 9. COB:

2 4 MM. DIAMETER AT MID-POINT

Strength: 1 = WEAK 2 = STRONG

Color: 1 = WHITE 2 = PINK 3 = RED 4 = BROWN  
5 = VARIEGATED 6 OTHER (Specify) \_\_\_\_\_

## 10. DISEASE RESISTANCE (0 = Not Tested, 1 = Susceptible, 2 = Resistant):

0 STALK ROT (Diplodia)	0 STALK ROT (Fusarium)	0 STALK ROT (Gibberella)
2 NORTHERN LEAF BLIGHT	2 SOUTHERN LEAF BLIGHT	2 SMUT (Common)
0 SOUTHERN RUST	1 CORN SMUT (Head)	1 BACTERIAL WILT (Stewarts)
1 BACTERIAL LEAF BLIGHT (Goss')	0 MAIZE DWARF MOSAIC	0 STUNT
0 OTHER (Specify) _____		

## 11. INSECT RESISTANT (0 = Not Tested, 1 = Susceptible, 2 = Resistant):

2 CORNBORER	0 EARWORM	0 SAPBEETLE	0 APHID
0 ROOTWORM (Northern)	1 ROOTWORM (Western)		
0 ROOTWORM (Southern)	0 OTHER (Specify) _____		

## 12. VARIETIES MOST CLOSELY RESEMBLING THAT SUBMITTED FOR THE CHARACTERS GIVEN:

CHARACTER	VARIETY	CHARACTER	VARIETY
Maturity	PHG47	Kernel Type	PHG47
Plant Type	PHG47	Quality (Edible)	
Ear Type	PHG47	Usage	G50

## REFERENCES:

- U.S. Department Agriculture. Yearbook 1937.  
 Corn: Culture, Processing, Products. 1970 Avi Publishing Company, Westport, Connecticut. (Numerous Authors)  
 Emerson, R.A., G.W. Beadle, and A.C. Fraser. A Summary of Linkage Studies in Maize. Cornell A.E.S., Mem. 180. 1935.  
 The Mutants of Maize. 1968. Crop Science Society of America, Madison, Wisconsin.  
 Stringfield, G.H. Maize Inbred Lines of Ohio. Ohio A.E.S. Bul. 831. 1959.  
 Butler, D.R. 1954 - A System for the Classification of Corn Inbred Lines - PhD. Thesis, Ohio State University.

COMMENTS: Heat Units are accumulated from daily temperatures as follows:  
 HI = Maximum air temperature in Fahrenheit, but not greater than 86.  
 LO = Minimum air temperature in Fahrenheit, but not less than 50.  
 Heat Units = (HI + LO)/2 - 50, but not less than 0.



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14D. Exhibit D. Additional Description of 'PHK76'

PHK76 is a yellow dent inbred line of corn, Zea Mays L.

As an inbred per se, PHK76 is quite different than most inbred lines. It is, however, most similar to the Pioneer proprietary inbred line PHG47. These similarities are expected because some of the parentage of PHK76 and PHG47 are in common. For comparative purposes, data are attached with comparisons of PHK76 to the Pioneer proprietary inbred lines PHG47 and G50.

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14D. Exhibit D. Inbred per se comparison of PHK76 and PHG47 grown at the same locations. All values are expressed as percent of the test mean except yield, which is expressed as bushels/acre adjusted to 15.5% moisture, and GDU shed and silk, which are expressed in actual growing degree units.

	Inbred	Yield	Percent Yield	Moisture	GDU Shed	Stalk Lodging	Root Lodging	Barren Plants	Stay Green	Test Weight	Grain Quality	Cob Scores	Seedling Vigor	Plant Height	Ear Height	GDU Silk
No. of Reps.	110															
	PHK76	77	122	99	1340	100	102	98	126	104	133		81	106	100	1300
	PHG47	47	73	88	1310	91	106	101	65	102	97		77	83	65	1280
Diff.		30	49	11	30	9	4	3	61	2	36		4	23	35	20

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14D. Exhibit D. Comparison of PHK76 and G50 crossed to the same tester line and the hybrids evaluated at the same locations. All values are expressed as percent of the test mean except yield, which is expressed as bushels/acre adjusted to 15.5% grain moisture (1986 data).

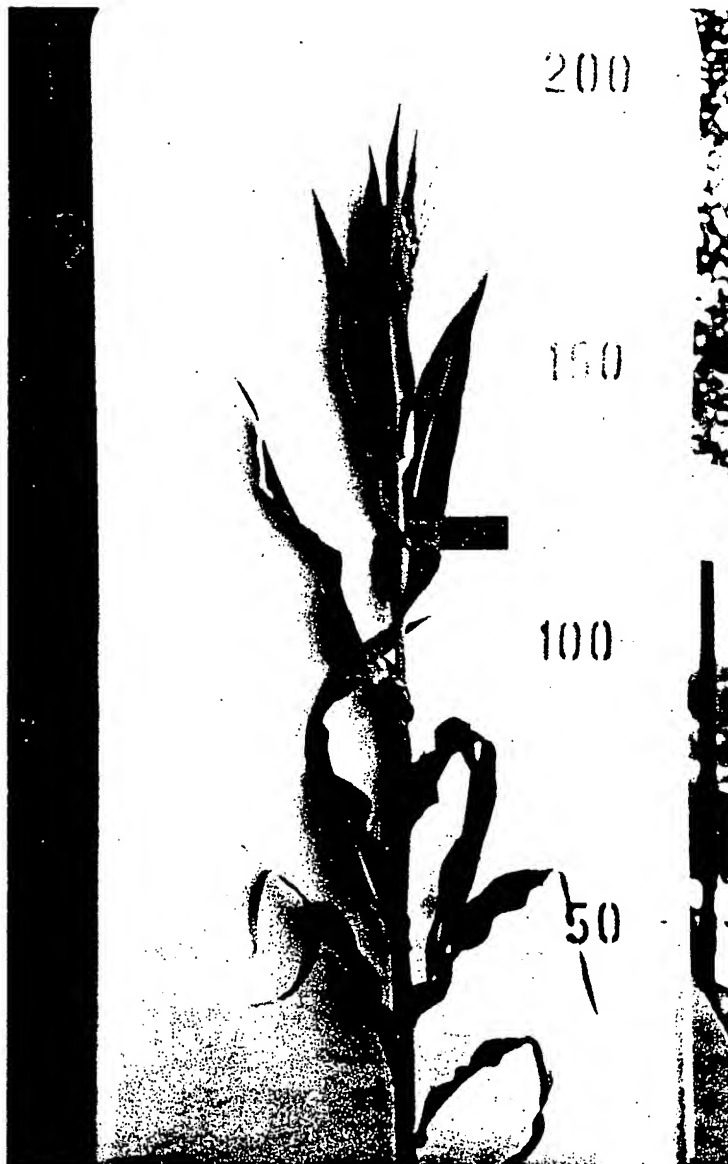
	Inbred	Yield	Percent Yield	Moisture	GDU Shed	Stalk Lodging	Root Lodging	Barren Plants	Stay Green	Test Weight	Grain Quality	Cob Scores	Seedling Vigor	Plant Height	Ear Height		
No. of Reps.		82	82	84	22	84	40	16	47	84	-	2	47	40	40		
	PHK76	143	92	100	98	91	94	100	76	103	-	148	92	97	97		
	G50	155	99	99	100	100	96	100	78	102	-	123	87	101	107		
Diff.		12	7	1	2	9	2	0	2	1	-	25	5	4	10		

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14D. Exhibit D. Additional Description of 'PHK76' (continued)

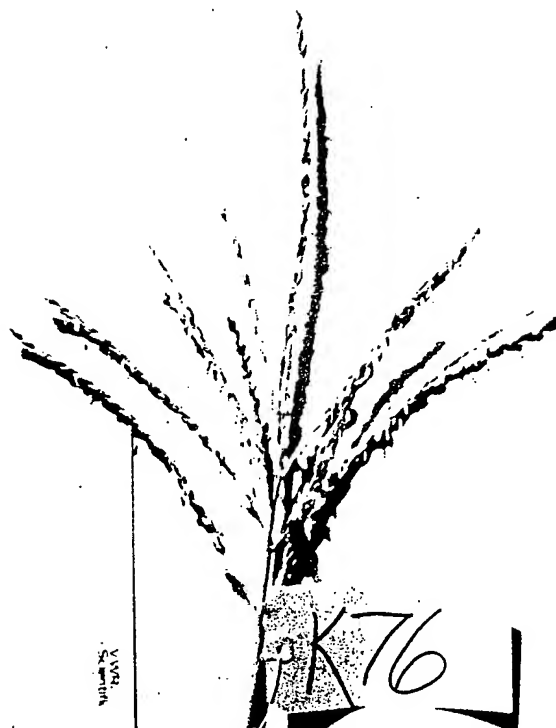
a. Whole Plant



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14D. Exhibit D. Additional Description of 'PHK76' (continued)

b. Tassel

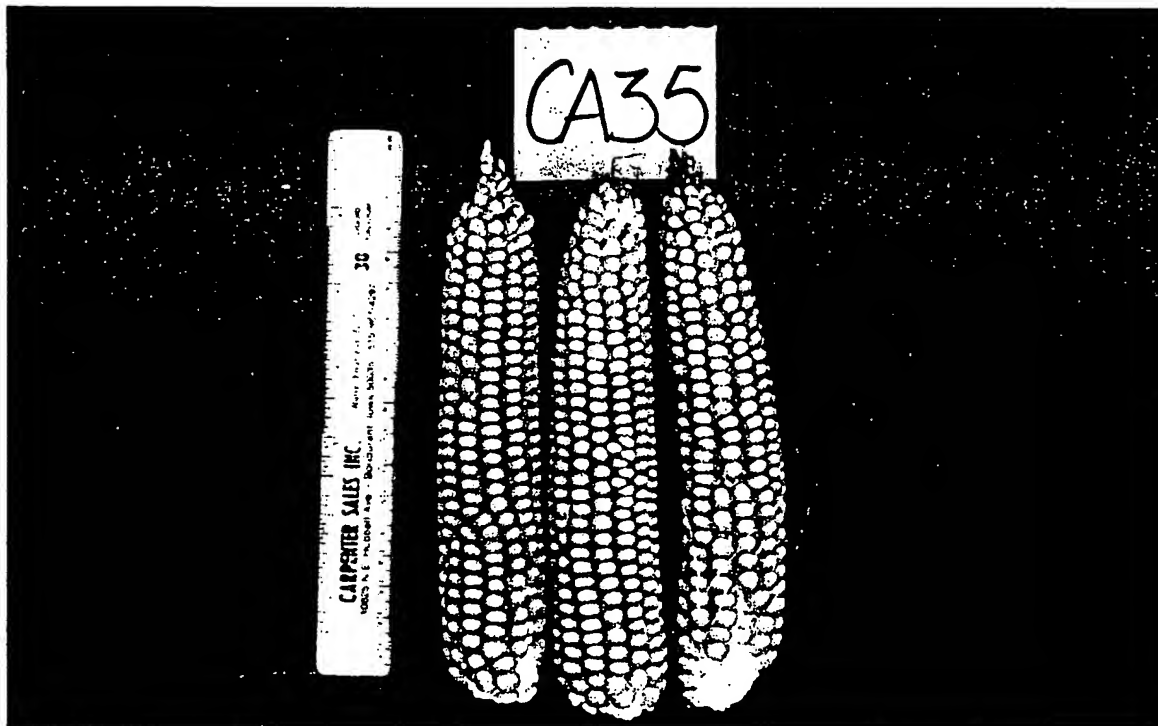


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14D. Exhibit D. Additional Description of 'PHK76' (continued)

c. Ear



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14E. Exhibit E. Statement of the Basis of Applicant's Ownership

Pioneer Hi-Bred International, Inc., Des Moines, Iowa, is the employer of the plant breeders involved in the development and evaluation of PHK76. Pioneer Hi-Bred International, Inc. has the sole rights and ownership of PHK76.